CLAIMS

1. A method for determining a cornering angle (α) of a tyre fitted on a vehicle during a running of said vehicle on a rolling surface, the tyre comprising an equatorial plane, the method comprising the steps of:
   - estimating a length ($PL_{i/e}$) of a contact region between said tyre and said rolling surface, said length being measured at a distance from the equatorial plane;
   - estimating a load exerted on said tyre (F_Z);
   - estimating a camber angle (γ) to which said tyre is subjected;
   - deriving such cornering angle from said camber angle, tyre load and contact region length.
2. A method according to claim 1, characterized in that said step of measuring a length ($PL_{i/e}$) of a contact region comprises the step of acquiring a first acceleration signal.
3. A method according to claim 2, characterized by further comprising a step of low-pass filtering said first signal.
4. A method according to claim 2 or 3, characterized in that said step of acquiring a first signal comprises acquiring a tangential acceleration signal.
5. A method according to claim 4, characterized in that the step of acquiring a first signal comprises measuring a distance between a maximum value and a minimum value of said first signal.
6. A method according to claim 2 or 3, characterized in that said step of acquiring a first signal comprises acquiring a radial acceleration signal.
7. A method according to claim 6, characterized in that the step of acquiring a first signal comprises measuring a distance between two maxima of said first signal.

8. A method according to any of previous claims, characterized in that the step of deriving the cornering angle from the camber angle, the tyre load and the contact region length comprises the step of providing characteristic curves of the contact region ($PL_{i/e}$) versus the cornering angle (α) for at least one tyre load (F_Z).
9. A method according to claim 8, characterized by the further step of providing a fit equation approximating the characteristic curves of the contact region ($PL_{i/e}$) versus the cornering angle (α).
10. A method according to claim 9, wherein the step of providing a fit equation approximating the characteristic curves of the contact region ($PL_{i/e}$) versus the cornering angle (α) comprises the step of providing the equation of a straight line in a plane, characterized by the further step of associating values of slope ($K_\alpha(F_Z)$) and intercept ($Q(F_Z, \gamma)$) for predetermined conditions of tyre load (F_Z) and camber angle (γ) for said tyre.
11. A system for determining a cornering angle (α) of a tyre fitted on a vehicle during a running of said vehicle on a rolling surface, the tyre comprising an equatorial plane, the system comprising:
    - a device for measuring a length ($PL_{i/e}$) of a contact region between said tyre and said rolling surface, said length being measured at a distance from the equatorial plane;
    - a device for estimating a tyre load (F_Z) exerted on said tyre;
    - a device for estimating a camber angle (γ) to which said tyre is subjected; and
    - at least one processing unit being adapted to derive the cornering angle from said camber angle, tyre load and contact region length.
12. A system according to claim 11, characterized in that said measuring device comprises at least one radial accelerometer producing at least one radial acceleration signal.

13. A system according to claim 11, characterized in that said measuring device comprises at least one tangential accelerometer producing at least one tangential acceleration signal.
14. A system according to claim 11, 12 or 13, characterized in that said device for estimating a tyre load (F_Z) exerted on said tyre comprises at least one radial accelerometer producing at least one radial acceleration signal.
15. A system according to claim 11, 12 or 13, characterized in that said device for estimating a tyre load (F_Z) exerted on said tyre comprises at least one tangential accelerometer producing at least one tangential acceleration signal.
16. A system according to any of claims 11-15, characterized in that said measuring device and said device for estimating a tyre load (F_Z) exerted on said tyre comprises a sampling device adapted to sample said signal at a frequency of at least 5 kHz.
17. A system according to claim 16, characterized in that said sampling device is adapted to sample said signal at a frequency of at least 7 kHz.
18. A system according to any one of claims 11-17, characterized in that it further comprises at least one memory associated to said processing unit.
19. A system according to claim 18, characterized in that said at least one memory comprises pre-stored characteristic functions describing an expected contact region length ($PL_{i/e}$) versus comering angle (α), corresponding to predetermined conditions of tyre load and camber.
20. A system according to any one of claims 11 to 19, characterized in that said measuring device is included in a sensor device located in a tread area portion of said tyre.

21. A system according to claim 20, characterized in that said sensor device is disposed at a distance from the equatorial plane of the tyre comprised between 15% and 30% of the tread width, more preferably between 18% and 28% of the tread width, even more preferably between 20% and 25%.
22. A system according to claim 20 or 21, characterized in that said sensor device is secured to an inner liner of the tyre.
23. A system according to claim 22, characterized in that it comprises a damping element between said sensor and said inner liner.
24. A system according to any one of claims 20 to 23, characterized in that said sensor device further includes a transmitting device.
25. A system according to claim 24, characterized in that said transmitting device is operatively connected to a first antenna.
26. A system according to any one of claims 11 to 25, characterized in that it further comprises a filtering device adapted for low-pass filtering said acceleration signal.
27. A system according to any one of claims 18 to 26, characterized in that said sensor further comprises a power source.
28. A system according to claim 27, characterized in that said power source comprises a battery.
29. A system according to claim 27, characterized in that said power source comprises a self-powering device, being adapted to generate electrical power as a result of mechanical stresses undergone by said sensor device during running of said vehicle.
30. A system according to claim 29, characterized in that said self-powering device comprises a piezoelectric element.
31. A system according to claim 29 or 30, characterized in that said self-powering device comprises an electrical storage circuit.
32. A system according to claim 31, characterized in that said electrical storage circuit comprises a resistor and a capacitor.

33. A system according to any one of claims 20 to 32, characterized in that said processing unit is included within said sensor device.
34. A system according to any one of claims 20 to 33, characterized in that it further comprises a fixed unit located on the vehicle, comprising a receiving device for receiving data from said sensor device.
35. A system according to claim 34, characterized in that said receiving device comprises a second antenna.
36. A system according to claims 25 to 35, characterized in that said first antenna and said second antenna are adapted for data transmission at a frequency comprised between 400 and 450 MHz.
37. A method of controlling a vehicle having at least one tyre fitted thereon, comprising:
    - determining a cornering angle of said tyre by a method according to any one of claims 1-10;
    - passing said determined cornering angle to a vehicle control system of the vehicle; and
    - adjusting at least one parameter in said vehicle control system based on said determined cornering angle.
38. A method according to claim 37, characterized in that said vehicle control system comprises a brake control system, and in that said step of adjusting at least one parameter comprises adjusting a braking force on said tyre.
39. A method according to claims 37 or 38, characterized in that said vehicle control system comprises a steering control system, and in that said step of adjusting at least one parameter comprises selecting a maximum variation allowed from steering commands.
40. A method according to any one of claims 37 to 39, characterized in that said vehicle control system comprises a suspension control system, and in that said step of adjusting at least one parameter

comprises adjusting a stiffness of a suspension spring associated to said tyre.